DOCUMENT RESUME

ED 369 818 TM 021 458

AUTHOR Noel, Rita Thomas; Hunter, Jennie L.
TITLE Assessing the Implementation of a State Wide Competency-Based Student Tracking System in Business Education.
PUB DATE Apr 94
NOTE 22p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 4-8, 1994).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; Accountability; *Business Education; Business Education Teachers; Competence; Computer Software; *Data Collection; Educational Improvement; High Schools; High School Students; Item Banks; Keyboarding (Data Entry); *Management Systems; Pilot Projects; Program Evaluation; *Program Implementation; *Secondary School Teachers; State Legislation; Student Evaluation; Surveys; Test Items
IDENTIFIERS Competency Based Assessment; *North Carolina; Reform Efforts; *Vocational Competency Achievement Tracking Sys NC

ABSTRACT

The Vocational Competency Achievement Tracking System (VoCATS) in North Carolina is a competency-based instructional management system that allows the collection of data on student performance achievement before, during, and after instruction. A preliminary pilot study was conducted to evaluate the implementation of the VoCATS program with secondary business teachers in the western part of the state. A survey about VoCATS was then completed by 17 male and 69 female high school teachers. Approximately 73% were using the materials for the first time and nearly 25% were using them for the second year. Location of the software varied by school and coordinator, but it was generally kept in the high school. Keyboarding was the course in which all three VoCATS items were most often used. Thirty-nine percent of teachers found VoCATS materials very helpful or helpful in planning, and 54% found the curriculum guide useful. Forty percent used the VoCATS test-item banks more than twice in a year, and 68% used non-VoCATS test materials. Seventy-three teachers, if given a choice, would continue to use VoCATS materials. Teacher recommendations for improvement centered on editing and revising item-bank materials. Six tables present survey findings. (Contains 24 references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 369 818

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
RITA THOMAS NOEL

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Assessing the Implementation of a State Wide Competency-Based Student Tracking System in Business Education

RITA THOMAS NOEL AND JENNIE L. HUNTER
WESTERN CAROLINA UNIVERSITY
CULLOWHEE, NC 28723

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION
SIG: BUSINESS EDUCATION AND
INFORMATION SYSTEMS RESEARCH
NEW ORLEANS, LA

APRIL 4-8, 1994

TM021458

Assessing The Implementation of a State-Wide Competency-Based Student Tracking System in Business Education

by

Rita Thomas Noel and Jennie Hunter
Western Carolina University

INTRODUCTION

In the 1980's over 30 reports were released concerning education reform including *The Unfinished Agenda* and *A Nation at Risk* (Lynch, 1991). Weimer (1992) and Mahoney (1992) insist the American education system is producing functional illiterates and reform efforts have failed because of impatience and a search for quick solutions. Wirth (1992) in *Education and Work for the Year 2000* states that vocational education has a vital role in the forming/restructuring of high schools with Perkins targeting populations that need assistance.

Some form of Outcome-Based Education (OBE) is the strategy being used in 42 states (Varnon and King, 1993) to track student achievement and to be accountable at the same time. Outcome-Based Education through redesigning student assessment and reporting programs requires students to demonstrate their knowledge and skills, thus the assessments used to evaluate student performance become critically important (O'Neil, 1993; O'Neil, 1994). Schools should be accountable for demonstrating that students have mastered important outcomes.

Not only is assessment being implemented in vocational education, teachers are implementing assessment/accountability/evaluative levels in technology (Madden, 1993), communication (Goulden, 1992), curriculum (Beale, 1993; Lohman, 1993; Sugarman, 1993; Hawkins, et. al., 1993) math (Bulloch and Kent, 1992; Critchley, 1992), reading and writing (Merina, 1992; Sugarman et. al., 1993), biology (Reid, 1992), science (Brown, 1992), social studies (Nickell, 1992), geography (Kon and Martin-Kniep, 1992), and language arts (Hiebert and Hutchison, 1991).

The trend toward accountability is probably the most significant development in the Human Resource Development (HRD) field in recent years. The hottest issues in the HRD field are evaluation and results-oriented training (Phillips, 1991). Lee (1990) indicates (HRD) field has grown at a phenomenal rate in recent years in formal training--the US organization is spending 45.5 billion dollars on accountability.

In addition to Perkins, the impressive work, *A Nation Prepared: Teachers for the 21st Century (Carnegie Task Force on Teaching as a Profession, 1986)* made the following statement as one of its 14 recommendations:

> Restructure schools to provide a professional environment for teaching, freeing them to decide how best to meet state and local goals for children while holding them accountable for student progress.

In the review of literature, no studies directly compare students or schools in outcome-based education classes or schools to control groups. Therefore in absence of research, communities should decide on what schools and students are accountable for.

Background

Since the early 1970s vocational education in North Carolina has focused on individualized instruction tied to competency-based education. In recent years, instructional management techniques and technological developments have evolved to a point at which computer-assisted instructional management is now possible.

Legislative incentives tied to the Basic Education Plan, State Accreditation, and Senate Bill 2 have created a demand to structure vocational education locally to assess, teach, and track each student's performance (i.e., learning or achievement outcomes) based on core competencies. The School Improvement and Accountability Act of 1989 created the need to have access to valid and reliable information regarding the status of student performance in each vocational course and program.

Obtaining this data in vocational education requires a system which is called VoCATS--Vocational Competency Achievement Tracking System. VoCATS is a competency-based instructional management system which allows the collection of data on student performance achievement prior to, during, and following instruction. Data are in the form of competency mastery status, pre- and post- test scores and gain scores.

Products included in the VoCATS curriculum package for each vocational education course/program are:

- Core competency listing in weighted course/test blueprint format,
- Computer-managed Competency/Test-Item Bank,

- Curriculum guide with detailed content outline and suggested learning activities for students, and
- Competency-based equipment, materials, and supplies list.

The North Carolina VoCats Survey

The VoCats Survey of Western North Carolina business teachers was developed and completed in response to a SDPI request for proposals in January of 1993.

In the past five years, the VoCats components have been implemented in several different stages for vocational teachers in North Carolina. Teachers have been involved in all of the following tasks: developing and implementing blueprints, preparing calendars of instruction, planning and assembling competency-based criterion-referenced tests, administering the tests, scoring and generating reports, accommodating the at-risk and special needs student, and interpreting and using the results of the pre-interim-post tests in teaching and reporting student progress.

In 1992-93, all Vocational Directors in the state were to have provided their vocational teachers with access to copies of the computerized test banks, the capacity to tract and record student progress, and available written curriculum guides.

During the 1992-93 school year, theoretically, all vocational teachers had an opportunity to use the blueprints, test item banks and available curriculum guides. Feedback from users of the VoCats program is a necessary process before refining and revising the existing program.

Purpose and Objectives

The purpose of this study was to conduct a preliminary pilot study evaluating the implementation of the VoCats program with selected secondary business teachers in the Western Region.

Objectives of the study:

1. To obtain feedback from business teachers concerning the model used for implementing the VoCats program in their courses.
2. To determine the effectiveness of blueprint data on class planning and class scheduling.

3. To determine the areas of improvement needed in the VoCats system.

4. To develop a survey instrument appropriate for use with all vocational teachers within the state.

5. To provide results of the study to the SDPI, Vocational and Technical Education Division.

METHODS AND PROCEDURES

A single-page, two-sided survey instrument was developed and reviewed by professional educators representing the SDPI, Vocational Directors, High School Teachers, and Professional Organizations. Appropriate revisions were made as needed. Superintendents, Vocational Directors, and Principals received a copy of the questionnaire requesting their permission to survey the teachers in their district. All administrators were willing to have their teachers participate in the study.

Using a list of high school teachers supplied by DPI, a total of 125 questionnaires were mailed to secondary school business teachers in the Western Region of North Carolina. The initial mailing began in late April with a second mailing completed in May.

Returned questionnaires represented a 71 percent response rate.

FINDINGS

Respondent Profile

Respondents were represented by 17 males and 69 females. One respondent did not complete the gender identification. Table 1 represents the number of reported years of teaching experience for participants.

High school teachers responding represented a variety of student enrollment by school. Table 2 illustrates the size of the high schools from which teachers were represented in the study.

Table 1

Number of Years of Respondent Teaching Experience

Years	Number	Percent
Less than One Year	2	2.3
One to Five Years	23	26.4
Six to Ten Years	7	8.0
Eleven to Fifteen Years	17	19.5
Sixteen to Twenty	12	13.8
More than Twenty-one	26	29.9

Teachers reported using the VoCats materials in their business classes as follows:

- 63 (72.4 percent) were using the materials for the first time.
- 22 (25.3 percent) were using the materials for the second year.

No teacher indicated using the materials for more than two years.

Table 2

Size of High School by Student Enrollment

Student Enrollment	Number	Percent
Less than 500 students	17	19.5
500-800 students	20	23.0
800-1200 students	37	42.9
1200-1600 students	10	11.5
More than 1600 students	1	1.1
No response	2	2.3

Person Responsible for Administering VoCats

Teachers were asked to indicate who was responsible for coordinating VoCats within their individual schools. Responses are illustrated in Table 3.

Table 3

Person Responsible for Coordinating VoCats

Title	Number	Percent
Teacher Responding to Survey	11	12.6
Department Chairperson	3	3.4
Vocational Director	24	27.6
IEC	29	33.3
Vocational Coordinator	6	6.9
Other	14	16.1

Titles supplied in the "Other" category included: vocational secretary, accounting teacher, VoCats coordinator (which in one case was another business teacher and one indicated the coordinator was available from 11 a.m.--3:00 p.m.), and no coordinator.

Location of VoCats Software

Respondents were asked "where the copy of the VoCats software was located." Two repondents indicated they had their own personal copy, 70 indicated it was located within the high school in a variety of locations, 5 indicated the software was located at the local administrative unit, and 3 indicated "other."

The location within the high school included: vocational workroom, computer lab, business office, vocational office, business education classroom, career center, planning area for voc. building, local director's office, vocational teachers classroom, another business teachers classroom, IEC's office, library, guidance office, secretary's office, and in a conference room.

Courses in Which VoCats Materials are Used

Table 4 illustrates the courses in which respondents are using VoCats materials. In the table, BP indicates "blueprint," TIB indicates "test item bank," and CG represents "curriculum guide."

Table 4

Courses in Which Respondents Indicate Using VoCats Materials May 1993							
Course	BP	TIB	CG	Course	BP	TIB	CG
Advanced Keyboarding/Document Processing	23	26	14	Computerized Accounting II	14	12	6
Business Communications	1	1	1	Exploring Business and Marketing	1	1	1
Business Computer Programming	3	4	2	Keyboarding	49	44	27
Business Computer Technology	7	9	5	Office Technology and Procedures I	21	22	13
Business Law		1		Office Technology and Procedures II	14	14	12
Business Management	3	1	2	Principles of Business	16	16	11
Computer Applications I	29	26	19	Shorthand I	1		
Computer Applications II	11	8	6	Small Business/ Entrepreneurship	3	3	3
Computerized Accounting I	24	24	15	Other	2	2	2

BP=blueprint TIB=test item bank CG=curriculum guide

Keyboarding represents the single curriculum area in which blueprints, test item banks, and curriculum guides are most frequently used. After Keyboarding, Computer Applications I, Computerized Accounting, Advanced Keyboarding/Document Processing, and Office Technology and Procedures I represent the four subject areas in which VoCats materials are being used most often as indicated by responding teachers.

How Helpful are VoCats Materials for Planning Classtime and Lesson Plans?

Respondents rated the "helpfulness" of blueprints as follows: "very helpful" 16.3 percent (13); "helpful" 22.5 percent (18); "somewhat helpful" 35 percent (28); "not very helpful" 18.8 percent (15); and, "not helpful at all" 7.5 percent (6).

Sixty-seven of the respondents using curriculum guides rated the "helpfulness" of available curriculum guides as follows: "very helpful" 16.3 percent (11); "helpful" 37.3 percent (25); "somewhat helpful" 32.8 percent (22); "not very helpful" 9 percent (6); and, "not helpful at all" 4.5 percent (3).

Teaching Effectiveness and the Use of Blueprints

Respondents could check more than one response to the question, " What has been the effect of the blueprints on teaching effectiveness?" Results were as follows:

- Made lesson planning easier — 17.5 percent (22)
- Made objectives for testing easier to identify — 34.1 percent (43)
- Made it difficult to adhere to preset time schedule — 28.6 percent (36)
- Increased teaching time for some objectives — 16.7 percent (21)
- Increased time for teaching basic/skills learning tasks — 3.2 percent (4)

What Teachers Did When Topic Was Not Completed During Suggested Time on Blueprint

Teachers were asked to indicate what they did when the blueprint did not allow enough time for them to cover a topic. Responses were as follows:

- skip items not covered — 17.3 percent (14)
- use time from another unit — 60.5 percent (49)

♦ prepare a handout for items missed	11.1 percent	(9)
♦ select items from test bank and let students practice	11.1 percent	(9)

Appropriateness of Reading Level for Test Items

Teachers were asked to indicate how appropriate the reading level of the test item banks was for their students. Results for appropriate reading level were as follows: "very appropriate level" 3.6 percent (3); "appropriate" 46.4 percent (39); "somewhat appropriate" 31 percent (26); "not very appropriate" 16.7 percent (14); and, "not appropriate at all" 2.4 percent (2).

How Often Teachers Used Test Item Banks

Teachers were asked to indicate how often they used test bank items. The responses are illustrated below:

♦ pre-test and post-test only	27.0 percent	(24)
♦ after each unit	16.9 percent	(15)
♦ every other unit	4.5 percent	(4)
♦ more than twice a year	40.4 percent	(36)
♦ other	11.2 percent	(10)

Use of Additional Non-VoCats Test Materials

Teachers were asked, "How often do you use non-VoCats test materials?" Responses were as follows:

♦ for every unit	33.8 percent	(27)
♦ for most units	33.8 percent	(27)
♦ once or twice a semester	18.8 percent	(15)
♦ never	11.3 percent	(9)
♦ other	2.5 percent	(2)

Type of Test Questions Used Most Often to Reinforce Class Materials

Teachers were asked to indicate the type of test question used most often to reinforce class material. Responses were as follows:

♦ true/false	14 percent	(15)
♦ multiple choice	68.2 percent	(68.2)
♦ matching	12.1 percent	(13)
♦ short answer	4.7 percent	(5)
♦ essay	.9 percent	(1)

Teacher Responses to Writing of Test Items

Teachers were asked to indicate their opinion of test items. Listed below are the responses to the question "generally, test items were:"

♦ clear and well written	28.8 percent	(23)
♦ testing at the recall level only	17.5 percent	(14)
♦ contained errors and required editing	53.8 percent	(43)

Assessing Performance Skills

Responses to the question, "How often did you use test bank items to assess performance skills of your students," are as follows:

♦ after each unit	8.2 percent	(6)
♦ every other unit	2.7 percent	(2)
♦ occasionally	54.8 percent	(40)
♦ more than twice a year	15.1 percent	(11)
♦ other	19.2 percent	(14)

Printing Out VoCats Materials

More than 58 percent of the teachers indicated they had "very few problems" with printing out the test items using the VoCats software. About 30 percent indicated they had "a few problems" and 11 percent indicated "quite a few problems" or "excessive problems."

Evaluating Student Progress with VoCats

Teachers were asked to indicate "how helpful the VoCats program was in evaluating student progress." Responses were as follows:

♦ very helpful	2.8 percent	(2)

♦	helpful	33.3 percent	(24)
♦	somewhat helpful	40.3 percent	(29)
♦	not helpful at all	23.6 percent	(17)

Teacher Opinion Regarding VoCats

Teachers were asked to indicate their agreement or disagreement with five statements/questions. Table 5 illustrates the opinions of business teachers.

Overall, more than fifty percent of teacher responses represent positive opinions regarding the VoCats program. However, 53 percent of the respondents did not feel they had appropriate input into the development of the program. Fifty-one percent of the respondents also did not feel that VoCats, as it is now designed, measured the learning taking place in the classroom.

Teacher Comments for Improving VoCats

Individualized comments were received from 63.9 percent of the responding business teachers. A list of original unedited comments is included in the appendix of this report.

An attempt to categorize all the comments provided the following summary of results in Table 6.

Table 5

Opinions of Teachers On Selected Questions Regarding VoCats May 1993				
Statement/Question	Strongly Agree	Agree	Disagree	Strongly Disagree
Test items measured critical thinking skills as well as knowledge and performance.	5.3% (4)	53.9% (41)	35.5% (27)	5.3% (4)
NC business teachers had appropriate input into the development of the VoCats program.	9.5% (7)	37.8% (28)	35.1% (26)	17.6% (13)
If given a choice, as the VoCats program is improved and revised, I would elect to continue to use the program.	23.2% (19)	50.0% (41)	20.7% (17)	6.1% (5)
I feel the VoCats competencies and test bank (as it is now designed), measure the learning taking place in my classroom.	3.7% 3	45.1% 37	37.8% 31	13.4% 11
Competency-based programs are the most effective way to teach business subjects to high school students.	10.1% (8)	65.8% (52)	21.5% (17)	2.5% (2)

Table 6

Summary of Teachers Comments to Improve VoCats Listed by Frequency of Response May 1993	
Comment	Number
Problems with Test Item Bank--Faulty, irrelevant, outdated, incorrectly worded, inability to score short answer or essay on scantron sheet	25
Editing and proofreading errors in VoCats materials	9
Missing or incorrect answer key	4
Difficulty with and time required to generate tests without duplication of test questions	4
Computer malfunctions at individual's school	3
Need for more in-service training with test-tracker and test item bank	3
Need to coordinate textbooks selected for course and test item banks	2
Need to consolidate information--too much information to go through in amount of time available.	2
Need to test performance skills as well as theory	2
Problems occur with location of software and location of copy machine.	2
A single coordinator is needed to assist teachers with VoCats	1
Teachers need to be allowed to select own pre-test and post-test questions.	1
Blueprints need to schedule time for testing	1
Problems still exist with availability of materials by local administration to individual teachers	1
Post-testing, using VoCats, was inappropriately timed	1
Not sold on benefits of VoCats	1
Need equipment to teach course objectives (telecommunications)	1

CONCLUSIONS

The following conclusions are based on the findings of this survey.

1. Respondent profile is representative of the business teacher population in Western North Carolina.

2. VoCats materials had been used by 98.7 percent ofsurvey participants.

3. No single job title descibes the individual school coordinator responsible for administering VoCats Test Item Banks.

4. Location of the VoCats software varies by school and coordinator and may be located within the high school or at a local administrative unit office. Eighty-one percent of the respondents indicated that the software was located somewhere within the high school.

5. Keyboarding (which is also most frequently taught) represents the single course in which most teachers reported using all three VoCats items, blueprints, test item banks, and curriculum guides. With the exception of Office Technology and Procedures II, Entrepreneurship and Principles of Business, less than 40 percent of the respondents indicated they used available curriculum guides (even when they were using test bank items and blueprints).

6. Thirty-nine percent of the respondents found the VoCats materials to be very helpful or helpful in planning class time.

7. Fifty-four percent of the respondents who indicated they were using curriculum guides found them to be "Very Helpful" or "Helpful."

8. Fifty-two percent of the respondents indicated they felt the blueprints made lesson planning easier and made testing objectives easier. However, 29 percent indicated difficulty in adhering to the time schedule.

9. Sixty percent of the teachers indicated they adjusted the time schedule using time from other units when a topic was not completed in a unit.

10. Fifty percent of respondents indicated reading level for test items was either "very appropriate" or "appropriate." The other fifty percent still have concerns over the appropriateness of reading level for test items.

11. Forty percent of the teachers used test item banks more than twice a year.

12. Sixty-eight percent of the teachers indicated they were using non-VoCats test materials with their classes.

13. Multiple choice is the preferred form of test item used by 68 percent of the business teachers for reinforcing class material.

14. Twenty-nine percent of the teachers indicated the test items were clear and well-written; however, fifty-four percent reported that test items contained errors and required editing before use.

15. Fifty-five percent of the teachers occasionally used test bank items to assess performance skills.

16. Fifty-eight percent of the business teachers indicated they had "very few problems" with printing out test materials.

17. Thirty-six percent of respondents indicated VoCats program was helpful in evaluating student progress. Sixty-four percent indicated it was "somewhat helpful" to "not helpful at all."

18. Fifty-nine percent of the teachers felt critical thinking skills were assessed by VoCats test items.

19. Forty-eight percent of Western North Carolina business teachers felt they had appropriate input into the development of the VoCats program.

20. Seventy-three percent of the teachers responding to the survey indicated "if given a choice" they would elect to continue using the VoCats materials.

21. Forty-nine percent of the teachers indicated they felt competencies in the test bank measured the learning taking place in their classrooms.

22. Seventy-six percent of the teachers feel competency-based programs are the most effective way to teach business subjects.

23. Teacher comments for improving the VoCats program centered chiefly on editing and revising the test-item bank materials.

RECOMMENDATIONS

1. A Vocational Coordinator needs to be assigned for each individual school to oversee the distribution of materials and to assure computer program installation and maintenance.

2. Teachers should be proficient with VoCats software to enable them to generate their own tests for each unit within a reasonable time period.

3. Locating VoCats software adjacent to a copy machine and within easy access of all vocational teachers may encourage better use of test bank items for classroom practice and additional testing.

4. Curriculum guides should reflect test bank items and should serve as an additional resource for the classroom teacher. Where possible, curriculum guide material should be written **prior to the test-item bank**. The guides should represent continuit between learning objectives, resource materials and test items. Curriculum guides should also be self-contained and should require minimal "gathering" or "hunting" on the part of the classroom teacher.

5. Blueprints should include scheduled time for giving unit tests and for reviewing test results.

6. All test-item banks (and answer keys) should be reviewed for correctness, reading level, accuracy, relevancy, and format.

7. More performance skills should be included as part of the pre-test and post-test VoCats assessment. Multiple choice questions should not be the only test question form used for evaluating student progress by the VoCats program.

8. Continued visibility of the input from NC business teachers must be stressed if NC business teachers using the VoCats materials are to feel part of the team effort.

Suggestions for Additional Research

1. In the Spring of 1994 the VoCats survey should be administered to all business teachers in the state of North Carolina.

2. In the Spring of 1994 the VoCats survey, with subject area changes, should be administered to all vocational teachers in the state of North Carolina.

3. VoCats classrooms should be pre- and post- tested against non-VoCats classrooms to determine if common outcomes for all students represents more than minimum competencies for all students.

REFERENCES

Beale, A.V. (1993, January-February). Are your students learning you think you're teaching? *Adult Learning*, p. 18.

Brown, M. (1992, October 23). Set in stone. *Times Educational Supplement*, p. III.

Bulloch, R. and Kent, D. (1992, February 21). Bring home the bacon. *Times Educational Supplement*, p. 41.

Carnegie TasK Force on Teaching as a Profession. (1986). *A Nation Prepared: Teachers for the 21st Century*. New York: Carnegie Forum on Education and the Economy.

Critchley, P. (1992, October 9). Building a model solution. *Times Educational Supplement*, p. VI.

Goulden, N. R. (1992, July) Theory and vocabulary for communication assessment. *Communication Education*, p. 258.

Hawkins, J., Frederiksen, J., Collins, A., Bennett, D. and Collins, A. (1993, May). Assessment and technology. *Communications of the ACM*, p. 74.

Hiebert, E. H. and Hutchison, T. A. (1991, December). Research directions: the current state of alternative assessments for policy and instructional use. *Language Arts*, p. 662.

Kon, J. H. and Martin-Kniep, G. O. (1992, February). Students' geographic knowledge and skills indifferent kinds of tests: multiple-choice versus performance assessment. *Social Education*, p. 95.

Lee, C. (1990, October). Industry report: 1990. *Training*, pp. 29-32.

Lohman, D.F. (1993, October). Learning and the nature of educational measurement. *NASSP Bulletin*, p. 41.

Lynch, R. L. (1991). Teaching the 21st century. *Proceedings of the Eighth Annual Atlantic Coast Business and Marketing Education Conference*, Raleigh, NC, 11-14.

Madden, P. (1993, October 22). In search of certainties. *Times Educational Supplement*, p. T4.

Mahoney, J. K. (1992, June 8). No 'silver bullet' for improving schools, author says. *Nation's Cities Weekly*, p. 11 (1).

Merina, A. (1992, September 15). Innovation: how NEA members are changing the way schools work. *NEA Today*, p. 15.

Nichell, P. (1992, February). Doing the stuff of social studies: a conversation with Grant Wiggins (Executive Director of Consultants on Learning Assessment and School Structure) *Social Education*, p. 91.

O'Neil, J. (1993, January). Making sense of outcome-based education. *Instructor*, p. 46.

O'Neil, J. (1994, March). Aiming for new outcomes: the promise and the reality. *Educational Leadership*, pp. 6-10.

Phillips, J. J. (1991). *Handbook of training, evaluation and measurement methods.* Houston: Gulf Publishing Company.

Reid, H. R., Virkar, R. A. and Schuhmacher, R. A. (1992, July-August). Outcomes assessment as a context for evaluating the biology curriculum. *Bio Science*, p. 536.

Sugarman, J., Allen, J., Killer-Cogan, M. How to make authentic assessment work for you. *Instructor*, p. 66 (5).

Varnon, C.J. and King, R. L. (1993, December). A tidal wave of change--OBE in the USA. *Outcomes*, pp. 16-19.

Weimer, G. (1992: January 6). The biggest problem we have. *Industry Week*, p. 64.

Wirth, A. G. (1992). *Education and Work for the Year 2000.* San Francisco: Jossey-Bass Publishers.